Ali Gholami

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RESEARCH INTERESTS

- Information Theory, Coding Theory, Coded Computing for Machine Learning, Wireless Communications.

EDUCATION

- **Technische Universität Berlin** — Berlin, Germany
  Ph.D. in Telecommunication Systems — *Apr. 2021 – Nov. 2025*
  - **Thesis**: Coded Distributed Systems for Content Delivery, Privacy, and Computation
  - **Advisor**: Prof. Giuseppe Caire

- **Sharif Univeristy of Technology** — Tehran, Iran
  Ph.D. in Telecommunication Systems — *Sep. 2016 – Sep. 2018*
  - **Thesis**: Privacy in DNA Sequencing
  - **Advisors**: Prof. Mohammad Ali Maddah-Ali and Prof. Abolfazl Motahari

- **University of Tehran** — Tehran, Iran
  B.Sc. in Electrical Engineering major in communications — *Sep. 2012 – Sep. 2016*
  - **Thesis**: Timing Synchronization of CPM Modulation in MATLAB
  - **Advisor**: Prof. Ali Olfat

WORK EXPERIENCE

- **Technische Universität Berlin** — Berlin, Germany
  Research Assistant — *Apr. 2021 - Present*
  - **Research Project 1 "Demand- and Cache-Private coded caching"**: We studied the coded caching setting under the scenario where cache and demand information should be both kept private. Results were published at the International Symposium on Information Theory (ISIT) and the Transactions on Information Theory journal.
  - **Research Project 2 "Multi-Message Private Computation"**: We studied the Private Information Retrieval (PIR) setting under the scenario where the user aims to retrieve multiple linear functions from the database. Results were published at the International Symposium on Information Theory (ISIT) and the Transactions on Communications journal.
  - **Research Project 3 "Communication-Computation Efficient Gradient Coding"**: We studied the Gradient Coding setting under the hierarchical architecture and privacy concerns. Results were published at the International Symposium on Information Theory (ISIT) and a journal version will be submitted shortly.

- **Sarveen Technologies** — Tehran, Iran
  Research Assistant — *Oct 2019 – May 2020*
  - **Research Project "Indoor Positioning"**: I worked on Indoor Positioning using WiFi signal strength and Kalman filter. The approximate position of the user inside a building is indicated using power of the signal received from multiple access points, then the trajectory is refined using a Kalman filter through pre-defined patterns of movement.

PUBLICATIONS

- **A. Gholami**, T. Jahani-Nezhad, K. Wan and G. Caire, "Hierarchical Gradient Coding: From Optimal Design to Privacy at Intermediate Nodes." arXiv preprint arXiv:2502.18251 (2025).

- **A. Gholami**, T. Jahani-Nezhad, K. Wan and G. Caire, "Optimal Communication-Computation Trade-Off in Hierarchical Gradient Coding," 2025 **IEEE International Symposium on Information Theory (ISIT)**, Ann Arbor, MI, USA, 2025, pp. 1-6, doi: 10.1109/ISIT63088.2025.11195435.

- **A. Gholami**, K. Wan, T. Jahani-Nezhad, H. Sun, M. Ji and G. Caire, "Fundamental Limits of Multi-Message Private Computation," in **IEEE Transactions on Communications**, vol. 73, no. 9, pp. 7462-7477, Sept. 2025, doi: 10.1109/TCOMM.2025.3543231.

- **A. Gholami**, K. Wan, T. Jahani-Nezhad, H. Sun, M. Ji and G. Caire, "On Multi-Message Private Computation," 2024 **IEEE International Symposium on Information Theory (ISIT)**, Athens, Greece, 2024, pp. 945-950, doi: 10.1109/ISIT57864.2024.10619493.

- **A. Gholami**, K. Wan, H. Sun, M. Ji and G. Caire, "Coded Caching With Private Demands and Caches," in **IEEE Transactions on Information Theory**, vol. 70, no. 2, pp. 1087-1106, Feb. 2024, doi: 10.1109/TIT.2023.3336792.

- **A. Gholami**, K. Wan, H. Sun, M. Ji and G. Caire, "Coded Caching With Private Demands and Caches," 2022 **IEEE International Symposium on Information Theory (ISIT)**, Espoo, Finland, 2022, pp. 1396-1401, doi: 10.1109/ISIT50566.2022.9834846.

- **A. Gholami**, M. A. Maddah-Ali and S. Abolfazl Motahari, "Private Shotgun DNA Sequencing," 2019 **IEEE International Symposium on Information Theory (ISIT)**, Paris, France, 2019, pp. 171-175, doi: 10.1109/ISIT.2019.8849382.

- **A. Gholami**, M. A. Maddah-Ali and S. A. Motahari, "Private Shotgun DNA Sequencing: A Structured Approach," 2019 **Iran Workshop on Communication and Information Theory (IWCIT)**, Tehran, Iran, 2019, pp. 1-6, doi: 10.1109/IWCIT.2019.8731624.

Projects

- **Variational Information Maximization for Feature Selection**   Sharif University of Technology
  Theoretical Machine Learning course
  - A survey on papers addressing selection of features that are informative rather than redundant in high dimensional data sets and comparison on the methods proposed.

- **Finding the path loss model corresponding to a facility**   Sharif University of Technology
  Wireless Communications course
  - We used cell phone applications to measure the signal power level received in various points in the Computer Engineering building and then extracted the model fitted to these measures. This model's usage was to find the best locations to put access points in every floor to get the best possible response for signal power level.

- **Implementation of an interface for managing a library and a grocery store**   University of Tehran
  Advanced Programming course
  - In this project, we wrote codes in C++ and used object-oriented implementation to do different tasks needed in a library and in another project a grocery store. We also used inheritance and other C++ functionalities.

- **Design of a transmitter and a receiver in MATLAB using a USRP cheap**   University of Tehran
  Software Defined Radio (SDR) Lab
  - We designed needed blocks in Simulink for both transmitter and receiver and examined the system by sending a picture with a dipole antenna using a USRP cheap.

Computer Skills

- **Proficient**: MATLAB, C/C++

- **Comfortable**: R, Python

Languages

- English: Fluent

- German: B2 level

- Farsi: Native language

REFERENCES

- **Professor Giuseppe Caire (TU Berlin)**: caire@tu-berlin.de

- **Professor Mohammad Ali Maddah-Ali (University of Minnesota)**: maddah@umn.edu

- **Professor Kai Wan (Huazhung University of Science and Technology)**: kai_wan@hust.edu.cn